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Supreme Court of the United States

ENTERGY CORPORATION

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.

PSEG FOSSIL LLC AND PSEG NUCLEAR LLC

v.

RIVERKEEPER, INC., ET AL.

UTILITY WATER ACT GROUP

v.

RIVERKEEPER, INC., ET AL.

ON PETITIONS FOR A WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

BRIEF FOR THE NUCLEAR ENERGY INSTITUTE AS AMICUS CURIAE SUPPORTING PETITIONERS

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INTEREST OF AMICUS CURIAE

The Nuclear Energy Institute (NEI) represents the commercial nuclear energy industry on regulatory matters.[1] NEI's members include every entity licensed by the Nuclear Regulatory Commission to generate electricity at a commercial nuclear power plant in the United States. Members also include nuclear plant designers, major architecture and engineering firms, fuel fabrication facilities, and other organizations and individuals involved in the nuclear energy industry.

The court of appeals' interpretation of Section 316(b) of the Clean Water Act in this case will have a significant impact on most, if not all, of the 38 U.S. nuclear power plants that do not currently use "closed-cycle" cooling water systems. NEI can offer the Court an informed perspective on the likely practical consequences of the court of appeals' decision.

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[1] No counsel for a party authored this brief in whole or in part, and no party or its counsel made a monetary contribution intended to fund the preparation or submission of this brief. Petitioners PSEG Nuclear LLC and Entergy Corporation, and certain members of petitioner Utility Water Act Group with nuclear plants, are members of NEI and make contributions that support all of NEI's activities, including the filing of amicus briefs. No person other than NEI, its members, or its counsel made a monetary contribution to the preparation or submission of this brief. Counsel of record for all parties received timely notice of NEI's intent to file this brief, and letters from all parties consenting to the filing of this brief have been submitted to the Clerk.

INTRODUCTION AND SUMMARY OF ARGUMENT

The petitions for a writ of certiorari should be granted because the court of appeals has misconstrued the Clean Water Act in a way that is likely to cause significant reductions in the nation's supply of nuclear power in the near and medium term. The court's decision thus poses a substantial threat to the sufficiency of the nation's electric power supply, to the stability of the electric power grid—and, perversely, to the very environmental values that the Clean Water Act and similar statutes are designed to protect.

Refusing to defer to the EPA's longstanding interpretation of its statutory mandate, the court of appeals has read Section 316(b) of the Clean Water Act to foreclose the agency from comparing incremental costs and benefits in determining what is, under particular circumstances, "the best technology available for minimizing [the] adverse environmental impact" caused by cooling water intake structures. The court's reasoning may require the EPA to mandate that all of the nation's 38 nuclear power plants that now use "once-through" cooling be retrofitted to use "closed-cycle" systems. Some plants, however, would likely find it either physically or economically impossible to comply with such a mandate, and would shut down. Others would incur exceptional costs and be unable to produce power for up to a year as they retrofit their systems. In addition, every facility that switches to a closed-cycle system will suffer a significant "energy penalty"—a permanent decrease in generating capacity.

Already, the supply of energy in the United States barely keeps pace with, and sometimes falls below, demand. In the near term, capacity margins will only get

tighter. Because the output of nuclear plants is large and constant, nuclear power plays a particularly important role in maintaining the nation's baseload power supply. Reducing the supply of nuclear power would have a disproportionately adverse effect on both the adequacy of the amount of power supplied to, and the stability of, the power grid.

Substantial time is required to secure approval for and to construct new nuclear plants. If existing nuclear plants are forced to close, either temporarily or permanently, in the near and medium term their power output could realistically be replaced only by plants that burn fossil fuels. Unlike nuclear plants, fossil-fuel plants produce greenhouse gases that are believed by many to contribute to global climate change. That would be, to say the least, an ironic result of overreading Section 316(b) to require the retrofitting of cooling systems even where the EPA or responsible state officials—not plant owners—would otherwise conclude that the costs involved are wholly disproportionate to any environmental benefit that might be achieved.

All this might be beside the point if, as the court of appeals held, Section 316(b) were so clear on its face as to leave no room for construction by the EPA. As petitioners demonstrate, however, that is not the case. To the contrary, the court of appeals adopted facially unreasonable limits on the sensible flexibility that Congress conferred here, as it typically does, on the expert agency it relies on to interpret and administer a broad statutory mandate. That error threatens very serious consequences, and it merits this Court's review.

ARGUMENT

I. NUCLEAR POWER PROVIDES A CRITICAL PORTION OF THE NATION'S ENERGY SUPPLY, PARTICULARLY IN LIGHT OF CLIMATE CHANGE

The supply of power in the United States is under strain. At times, supply in some areas can barely meet demand. During the summer of 2006, for example, a heat wave "required utility system operators, customers, and government agencies to implement emergency procedures in some areas." North American Electric Reliability Corporation (NERC), *2006 Long Term Reliability Assessment: The Reliability of Bulk Power Systems in North America* 5 (Oct. 2006), *available at* http://www.nerc.com/~filez/rasreports.html.[2] Blackouts were avoided principally "because generating capacity performed extremely well during this period." *Id.*

The problem is likely to get worse before it gets better. Over the next ten years, the utility industry expects peak demand to increase by over 17%, while committed generating capacity is expected to increase by only 8.4%. NERC, *2007 Long Term Reliability Assessment: The Reliability of Bulk Power Systems in North America* 10 (Oct. 2007) (2007 NERC Assessment), *available at* http://www.nerc.com/~filez/rasreports.html. In a number of regions, capacity margins are expected to drop well below target levels. *Id.* at 24.

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[2] NERC is the entity certified by the Federal Energy Regulatory Commission as the single "Electric Reliability Organization" for the United States under Section 215 of the Federal Power Act, 16 U.S.C. § 824o(c). *See Order Certifying North American Electric Reliability Corporation as the Electric Reliability Organization and Ordering Compliance Filing*, 116 FERC ¶ 61,062 (July 20, 2006).

Against this backdrop, nuclear power plants are an exceedingly important source of power. There are currently 104 operating units at more than 60 nuclear plants in the United States. These plants generate approximately 20% of the nation's electricity.[3] Along with coal and natural gas, nuclear energy is a foundational part of the nation's power supply.

Nuclear power is a particularly important source of generation because of its cost stability and output reliability. The supply and cost of nuclear power do not fluctuate significantly based on weather or climate conditions, fuel cost variability, or the vagaries of foreign suppliers. Nuclear plants are able to operate without interruption for extended periods, up to 24 months at a time. Because nuclear power can be so reliably generated, it helps supply the "baseload" of electricity that is required for the national electric power grid to function. Indeed, the stability of the grid depends on nuclear power.

Nuclear energy is also comparatively inexpensive. Nuclear plants are currently estimated to be the lowest-cost producers of baseload electricity.[4] The consistent availability of nuclear power at predictable prices

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[3] *See* Comments of the Nuclear Energy Institute, Comment ID 316bEFR.020.002, at 407. The comments cited in this brief are available at http://www.epa.gov/waterscience/316b/phase2/comments/author-ph2.pdf. The page citations provided are to this compilation of the comments.

[4] *See Status and Outlook for Nuclear Energy in the United States* 3-4 (Aug. 2006), *available at* http://nei.org/resourcesandstats/documentlibrary/reliableandaffordableenergy/reports/statusreportoutlook/.

also has a stabilizing effect on the electricity market as a whole.

Finally, nuclear power is increasingly cited as an important part of efforts to minimize adverse environmental impacts. As this Court has recognized, the world faces serious threats from global climate change. *See Massachusetts* v. *EPA*, 127 S. Ct. 1438, 1455 (2007). Many believe that climate change is caused in significant part by the emission of greenhouse gases, including carbon dioxide. Nuclear plants emit no such gases. For that reason, the United Nations Intergovernmental Panel on Climate Change, which recently shared the Nobel Peace Prize for its work on global warming, listed "nuclear energy" in its recently released Fourth Assessment Report as a "key" technology for mitigating greenhouse gas emissions—a technology, importantly, that is "currently commercially available."[5]

This point has concrete application in the United States today. Nuclear power plants—not solar or wind or other "alternative" energy sources—generate some

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[5] *See Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report* 17 (Nov. 16, 2007 draft), *available at* http://www.ipcc.ch/; *see also Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 269 (Cambridge Univ. Press 2007), *available at* http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html ("Total life-cycle [greenhouse gas] emissions per unit of electricity produced from nuclear power are . . . similar to those for renewable energy sources. Nuclear power is therefore an effective [greenhouse gas] mitigation option, especially through license extensions of existing plants enabling investments in retro-fitting and upgrading." (citations omitted)).

71% of all carbon-free electricity in America.[6] Increased electricity production by nuclear power plants is responsible for one-third of all reductions of carbon emissions by U.S. industry since 1993 as part of the Department of Energy's Climate Challenge and Climate Vision programs. Using nuclear power instead of fossil-fuel-burning power plants prevents almost 700 million metric tons of carbon dioxide emissions. For perspective, the volume of greenhouse gas emissions prevented by the use of nuclear power in the United States is equivalent to taking more than 90% of all passenger cars off the nation's roadways.

II. THE COURT OF APPEALS' DECISION COULD FORCE RETROFITTING AT EXISTING NUCLEAR PLANTS, EVEN IF INDEPENDENT REGULATORS WOULD OTHERWISE CONCLUDE THAT COSTS WHOLLY OUTWEIGH BENEFITS

Section 316(b) of the Clean Water Act directs the EPA, in establishing discharge standards under Sections 301 and 306 of the Act, to "require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." 33 U.S.C. § 1326(b). In applying that provision to existing power plants, the EPA concluded that it could and should compare the costs of adopting particular technologies to their expected incremental benefits. *See National Pollutant Discharge Elimination System—Final Regulations To Establish Requirements for Cooling Water Intake Structures at Phase II Existing*

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[6] The factual points in this paragraph are drawn from a more detailed discussion, *Environment: Emissions Prevented*, available on NEI's website at http://www.nei.org/resourcesandstats/nuclear_statistics/environmentemissionsprevented/.

Facilities, 69 Fed. Reg. 41,576, 41,576, 41,583 (July 9, 2004) (Phase II Rulemaking). This conclusion was in keeping with the EPA's 30-year history of taking costs and benefits into account in determining under Section 316(b) what was the "best technology available" for large power plants—including the plants approved and constructed during that period, which are now "existing facilities" subject to the Phase II regulations.

Accordingly, the EPA decided that existing plants should not be required to adopt closed-cycle cooling, even though that was the "best technology available" for *new* plants, because the cost considerations are radically different. *See* 69 Fed. Reg. at 41,605-41,606. Likewise, the agency concluded that a facility could seek special determination of the "best technology available" at a particular site "by demonstrating . . . that its costs would be significantly greater than the benefits of complying with [the generally applicable] performance standards at the facility." *Id.* at 41,603.

The court of appeals held that the text and structure of the Clean Water Act foreclose the EPA's approach. *See Riverkeeper, Inc.* v. *EPA*, 475 F.3d 83, 98-99, 114 (2d Cir. 2007). As petitioners PSEG, UWAG, and Entergy demonstrate, that is incorrect. *See* PSEG Pet. 17-27; UWAG Pet. 16-28; Entergy Pet. 25-35. We do not repeat the entire analysis here. We do note, however, that the court of appeals' reasoning is at war even with itself.

The court recognized that the word "available" is capacious enough to permit rejection of a technology so expensive that its cost could not be "reasonably borne" by "the industry" as a whole. *See* 475 F.3d at 99. The court never explained exactly what it meant by "the industry" bearing costs, but the formulation suggests

that the court would accept that a technology is not "available" if implementing it would be cost-prohibitive for a sufficient number of individual firms and their customers. If the statute can bear that meaning, it can also bear the interpretation adopted by the EPA—in effect, that a technology is not the "best technology available" in any particular instance if, under all the circumstances, the particular plant operator involved cannot reasonably be asked to bear the cost of implementing it. While the court of appeals preferred to draw the "availability" line in one place rather than the other, once it conceded that there was a line to be drawn, the specific placement was not its decision to make. *See Chevron U.S.A. Inc.* v. *Natural Res. Def. Council, Inc.*, 467 U.S. 837, 842-843 (1984).

Similarly, the court of appeals purported to draw support for its interpretation of Section 316(b) from other sections of the Clean Water Act. 475 F.3d at 97-98. But the provisions upon which the court relied expressly permit EPA to consider "such other factors as [it] deems appropriate," 33 U.S.C. § 1314(b)(2)(B), as well as "the cost of achieving [the] effluent reduction," *id.*; *id.* § 1316(b)(1)(B). Rather than support the court of appeals' decision, these provisions confirm its error.

The court of appeals stopped short of expressly ordering the EPA to mandate retrofitting of all existing plants to use closed-cycle cooling. Respondents, however, will no doubt argue that the court's reasoning requires that result. *See* 475 F.3d at 102 (stating that the court's "concern with the EPA's determination with respect to section 316(b) is further deepened by the Agency's rejection of closed-cycle cooling and selection of a suite of technologies as the basis for BTA"); *id.* at 103 & n.16 (expressing doubt as to whether a suite of technologies could "approach[] the performance of

closed-cycle cooling" (internal quotation marks omitted)); *id.* at 105 (remanding "for clarification . . . and possibly for a new determination of BTA"). The EPA may feel constrained to agree. Because the court of appeals expressly read Section 316(b) to prohibit any use of restoration methods, *id.* at 108-110, that approach will no longer be available on remand. In light of the court of appeals' severe limitation on the EPA's ability to consider costs, closed-cycle cooling may be the only technological solution left open to the agency.

The EPA has already determined that retrofitting plants to use closed-cycle cooling generally will reduce impingement and entrainment to a greater degree than upgrading the design and construction of water intake structures at once-through plants. *See* 69 Fed Reg. 41,576, 41,606.[7] While the reductions achievable using other technologies "approach[]" those from closed-cycle cooling, respondents will surely argue that they are not "essentially the same" in the only sense that the court of appeals would recognize as allowing selection of the lower-cost alternative. *See* 475 F.3d at 100-101. If that is correct, the court's decision will require the EPA to mandate retrofitting of all existing plants to use closed-cycle cooling, so long as the billions of dollars that retrofitting would cost could theoretically be borne by the industry as a whole.

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[7] The EPA determined that "closed-cycle, recirculating cooling systems (e.g., cooling towers or ponds) can reduce mortality from impingement by up to 98 percent and entrainment by up to 98 percent when compared with conventional once-through systems" in fresh water. *Id.* at 41,601. In contrast, the EPA's performance standards contemplating adoption of other technologies called for reduction of impingement "by 80 to 95 percent" and reduction of entrainment "by 60 to 90 percent." *Id.* at 41,598.

III. Mandating Use Of Closed-Cycle Cooling At Existing Nuclear Plants Would Have Significant Adverse Effects On The Nation's Power Supply—And On The Environment

The Phase II regulations struck down by the court of appeals cover all 104 nuclear power units currently in operation in the United States. Sixty-one of those units currently use once-through cooling. If all existing plants are required to convert to closed-cycle cooling, some will likely close entirely, and all will be subject to temporary closures of up to a year and suffer permanent decreases in net generating capacity. These closures and losses in efficiency would significantly diminish the nation's supply of nuclear power, contributing to shortfalls in generation, grid instability, and environmental harm. In part for these reasons, the Department of Energy "strongly" recommended to the EPA during the Phase II rulemaking that it "not include any requirement that has the effect of forcing any class of facilities to install wet [closed-cycle] cooling towers." Comments of Department of Energy, Comment ID 316bEFR.010.028, at 185.

A. Mandating That Existing Plants Be Retrofitted To Use Closed-Cycle Cooling Would Reduce The Nation's Supply Of Nuclear Power

Retrofitting existing nuclear plants to use closed-cycle cooling is at best a complicated, costly, and time-consuming process, and may not be possible or economically feasible at some plants. Closed-cycle cooling requires the construction of large towers to re-cool the water between cycles. Just finding the space for these towers is a significant challenge for many plants. In rejecting mandatory closed-cycle retrofits, the EPA noted that "31 out of 56 plants surveyed said that they would need to acquire additional property to accommo-

date cooling towers." 69 Fed. Reg. at 41,605. Even leaving aside cost, the agency recognized that there may be significant impediments to the acquisition and development of that additional land. *Id.*

To begin with, in some locations, especially in urban areas, it may be difficult or impossible to obtain sufficient vacant or clearable land adjacent to the existing plant site. 69 Fed. Reg. at 41,605. Moreover, even where land is nominally available, developing it for cooling-tower use may present daunting challenges. For example, retrofitting the Diablo Canyon plant on the central California coast, if it could be done at all, would require excavating a 1600-foot by 600-foot section of the Las Cañadas coastal hills adjacent to the plant to make room for the construction of 132 60-foot-tall water tower cells.[8] Retrofitting the San Onofre Nuclear Generating Station, on the coast between San Diego and Los Angeles, likely would require construction of cooling water tanks at the top of 100-foot bluffs overlooking the beach adjacent to the plant.

If the land necessary for cooling towers could be obtained, a plant owner would need to acquire federal, state, and possibly local permits to proceed with retrofitting. For example, some retrofits would require a license amendment from the Nuclear Regulatory Commission, which requires a formal approval process generally involving public hearings. *See* 10 C.F.R. § 50.91.[9]

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[8] Unless otherwise indicated, examples in this brief are drawn from information provided by plant operators.

[9] A license amendment is required if a proposed change to a nuclear plant involves, among other things, a modification to technical specifications. *See* 10 C.F.R. § 50.59(c)(1)(i). Whether retro-

Obtaining such amendments would consume substantial public and private resources. This would occur at a time when the Commission and industry are concentrating on applications to renew operating licenses at existing nuclear plants and on licensing and constructing new plants that are necessary to meet the expanding demand for power.

Ironically, efforts to obtain the permits necessary to address what the court of appeals viewed as the fish-protection requirements of the Clean Water Act could well be hampered by adverse environmental impacts of other sorts that might result from retrofitting plants to use closed-cycle cooling. For example, salt-water cooling towers produce large plumes of salt water vapor that can contribute to fogging and icing in the surrounding area and affect nearby electrical equipment. One may anticipate concern about increased noise. The prospect of extensive construction in sensitive areas, such as around the coastal Diablo Canyon and San Onofre plants, would raise substantial concerns that could delay or even preclude obtaining necessary approvals. As the EPA noted, for example, expanding some plants might require displacement of ecologically valuable wetlands. 69 Fed. Reg. at 41,605. Similarly, the San Onofre plant is surrounded by federal and state lands that support species protected by state and federal laws.

Apart from land and permits, retrofitting large existing plants to use closed-cycle cooling would be a significant engineering challenge. Among other things, closed-cycle cooling requires an extensive network of

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fitting to use closed-cycle cooling would require a license amendment would be a plant-specific determination.

pipes to circulate water to and from the plant's condensers. For example, it is estimated that retrofitting the Salem Generating Station to use closed-cycle cooling would require the demolition or abandonment of over three miles of existing 7-foot and 10-foot diameter circulating pipe and the installation of over 4 miles of new 7-foot pipe. *See, e.g.*, Comments of UWAG, Comment ID 316bEFR.041.351, at 1330. Additionally, many plants would need to reinforce their condensers to withstand the increased pressure resulting from closed-cycle cooling and otherwise modify them for use with the retrofitted system.

For all these reasons, where retrofitting nuclear plants to use closed-cycle cooling is possible at all, it would be very—sometimes prohibitively—expensive. As the EPA concluded:

> [A] national requirement to retrofit existing systems is not the most cost-effective approach and at many existing facilities, retrofits may be impossible or not economically practicable. EPA estimates that the total capital costs for individual high-flow plants (i.e., greater than 2 billion gallons per day) to convert to wet towers generally ranged from $130 to $200 million, with annual operating costs in the range of $4 to $20 million . . . .

69 Fed. Reg. at 41,605.

Indeed, the EPA recognized that, for a variety of reasons, its substantial cost estimates "may not fully reflect the costs of the option." 69 Fed. Reg. at 41,605. Consistent with that recognition, forecasts by individual plant operators run even higher. The Edison Electric Institute, the association of U.S. shareholder-owned electric companies, has estimated that retrofit-

ting the 38 existing once-through nuclear plants with closed-cycle cooling would cost between $10 billion and $19 billion.[10] Estimates of the cost of retrofitting all existing once-through plants with closed-cycle cooling submitted to the EPA by petitioner UWAG ranged from $40 to $66 billion. *See* UWAG Pet. 37. Using the high end of the EEI range, the average cost per nuclear plant would be $500 million. For each of four plants—Diablo Canyon, Salem Generating Station, San Onofre, and Indian Point—EEI or plant owners estimate that the cost of retrofitting could total $1 billion or more. At Diablo Canyon alone, retrofitting could cost in the range of $2.4 billion.

If retrofitting proceeds at any given plant even in the face of these geographical, governmental, environmental, technical, and financial challenges, it can require shutting the plant down for prolonged periods. The EPA estimated that plants would be unavailable for as long as 10 months. *See* 69 Fed. Reg. at 41,605. Private estimates suggest that retrofitting Diablo Canyon and San Onofre would render the plants unavailable for 12 months or more, that Indian Point would be closed for approximately 10 months, and that Oyster Creek would have to be shut down for more than four months. Extended outages would also be anticipated at the Salem facility. *See* PSEG Pet. 34 (estimating that a closed-cycle retrofit "would require partially suspending operations for at least 14 months, causing a net loss of 1150 megawatts . . . during that period").

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[10] This range is derived from cost estimates submitted to the EPA adjusted with some site-specific cost estimates provided by individual operators.

Finally, once returned to operation, retrofitted plants would produce less usable power than they did before. A steam power plant's condenser "operates under vacuum conditions (i.e. a pressure below normal atmospheric pressure)." Comments of the Department of Energy, Comment ID 316bEFR.010.101, at 239. Because cooling water in once-through systems has on average a lower temperature than water in closed-cycle cooling systems, the vacuum created in once-through systems is greater than in closed-cycle systems, which increases efficiency. *Id.* In addition, closed-cycle systems require more power to run the cooling system itself, leaving less for consumers.

In its Phase II rulemaking, the EPA relied on an estimate by the Department of Energy that the "energy penalty" resulting from converting existing once-through plants to closed-cycle cooling would generally amount to a 2.4% to 4.0% decline in energy production capacity. 69 Fed. Reg. at 41,605. The EPA noted a 5.3% energy penalty associated with the use of closed-cycle cooling for one nuclear plant that provides 78% of the electricity for Vermont. *See id.* Using the same DOE figures relied upon by the EPA, it has been estimated that retrofitting all existing nuclear plants to use closed-cycle cooling would reduce overall capacity by 2,117 megawatts. As the EPA explained with respect to both nuclear and non-nuclear plants, "on average 20 additional 400-MW plants might have to be built to replace the generating capacity lost by replacing once-through cooling systems with wet cooling towers if such towers were required by all Phase II facilities." *Id.*

In short, if the court of appeals' decision stands and requires the EPA to mandate retrofitting of closed-cycle cooling at all existing nuclear power plants, some

of those plants will likely find it physically or economically impossible to continue operation, and all will face temporary closures and permanent reductions in generating capacity. Either way, requiring retrofitting would significantly reduce the nation's supply of nuclear energy.

B. Reducing The Supply Of Nuclear Power Will Have Substantial Adverse Effects Both On The Energy Supply And On The Environment

The reduction in capacity caused by mandating retrofitting of existing nuclear plants will have a number of significant adverse impacts.

First, even if all plants ultimately remain in operation, the significant energy penalty caused by the use of closed-cycle cooling would by itself have a significant adverse impact on the power supply. While the lost capacity could eventually be replaced, in the short term air quality limitations would likely prevent fossil-fuel plants from meeting the entire shortfall, and existing nuclear plants lack additional capacity. In areas of the country already facing energy constraints, such as California and the mid-Atlantic/Northeast corridor, the near-term reduction in capacity would increase the likelihood of brownouts and blackouts during the summer months.

Loss of the power generated by nuclear plants that are forced to close would substantially exacerbate the problem. For example, in its comments to the EPA, petitioner Entergy estimated that if its Indian Point nuclear plant were to close, target reserve margins in New York could not be met and "the calculated number of days where emergency measures would be taken to prevent blackouts, etc., would rise by 800%." Comments of Goodwin Procter (submitted on behalf of En-

tergy Corp.), Comment ID 316bEFR.029.035, at 619. Even temporary plant closures to allow retrofitting would have a significant impact. Because of their length, the anticipated closures would likely overlap with the winter or summer peak electricity demand seasons, threatening the reliability of the power grid.

NERC has recognized that mandating closed-cycle cooling could adversely affect the nation's power capacity margins In its 2007 reliability report, NERC explained:

> While plant specific outcomes will vary, retrofitting existing power plants with cooling towers can reduce the capacity of those plants, which will exacerbate the supply concerns identified in ... this assessment. In some cases, retrofits may prove so costly that plants are retired earlier than projected, with the consequent loss of the plant's entire capacity. At a time when additional electricity generating resources are needed, the loss of existing generating capacity would undermine U.S. efforts to meet the growing demand for electricity.

2007 NERC Assessment at 12. And, as noted above, during the Phase II rulemaking the Department of Energy "strongly" recommended that the EPA not require existing plants to be retrofitted to use closed-cycle cooling. Comments of Department of Energy, Comment ID 316bEFR.010.028, at 185.

Mandating the use of closed-cycle cooling would likely also have significant adverse *environmental* effects. First, as explained above, at some plant sites a closed-cycle retrofit would raise its own substantial environmental issues. In addition to possible adverse effects on the land and air surrounding the plant, retrofit-

ting could even adversely affect the water resources protected by the Clean Water Act itself. Although a closed-cycle cooling system at a nuclear plant does not take in as much water day-to-day as a once-through system, it actually *consumes* (that is, permanently removes from the source water body) up to 80% *more* water overall. *See Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production—The Next Half Century* viii (Elec. Power Research Inst. 2002).

Second, where existing plants are forced to close or have their output cut by retrofitting, new nuclear plants cannot realistically replace the lost power over the short or medium term. Designing a new nuclear plant, obtaining necessary permits, and building the plant takes years. New nuclear projects already in early stages of development are not expected to begin production until 2015 to 2020. Thus, as a practical matter, for at least several years any generating capacity lost from existing nuclear plants would have to be replaced, if at all, by power generated using fossil fuels.

The EPA understood that requiring retrofitting would result in increased reliance on fossil fuels. *See, e.g.*, 69 Fed. Reg. at 41,605. That, in turn, would increase "the emission of sulfur dioxide, NO_x, particulate matter, mercury and carbon dioxide." *Id.* It is estimated that using fossil fuels to replace the nuclear power lost due to the retrofitting energy penalty alone could add 37,000 tons of sulfur dioxide, 13,000 tons of nitrogen oxide, and 14 million metric tons of carbon dioxide to the nation's atmosphere.[11] If capacity lost as a

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[11] Carbon dioxide typically is measured in metric tons, which are equivalent to approximately 2205 lbs.

result of nuclear plant closures were also replaced by power from fossil-fuel plants, the increase in greenhouse gas emissions would be even more severe.

* * *

Taking into account all of these concerns, the EPA reasonably concluded that, for existing power plants, the tremendous costs of retrofitting for closed-cycle cooling far outweigh the incremental benefits it provides, as compared to the use of other EPA-approved technologies, in reducing impingement and entrainment at water intake structures. Its judgment rested both on economic costs and on "non-water quality environmental impacts." 69 Fed. Reg. at 41,605.

If Congress had weighed the various competing economic and environmental considerations itself and clearly mandated a different approach, then the court of appeals would have been right to set aside the agency's judgment and enforce the congressional command. As petitioners have demonstrated, however, nothing in the language, structure, purpose, or previous judicial interpretation of the Clean Water Act precludes the EPA from taking economic and environmental costs into account, along with potential benefits, in determining what constitutes, under particular circumstances, the "*best* technology *available* for minimizing adverse environmental impact" under Section 316(b). On the contrary, it is precisely in circumstances such as these, involving the balancing of important social goals that interact in complex ways, that Congress most typically delegates to an agency the responsibility for particularized implementation of statutory standards.

Because the Act, unsurprisingly, leaves room for just the sort of complex agency judgment that the EPA

made here, the court of appeals erred in substituting its own absolutist analysis for the more balanced approach adopted by the EPA. That error threatens real, immediate, and far-reaching harm to the nation's power supply—and, ironically, to the very environmental values that the court no doubt thought it was protecting. It warrants review and correction by this Court.

CONCLUSION

The petitions for a writ of certiorari should be granted.

Respectfully submitted.

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